Abstract Submitted
for the MAR01 Meeting of
The American Physical Society

Sorting Category: 8.5 (Experimental)

Application of a ϕ^4 Model to the Liquid-Gas Critical Point of ^{3}He FANG ZHONG, INSEOB HAHN, M. BARMATZ, *Jet Propulsion Laboratory/Caltech, 4800 Oak Grove Dr. Pasadena, CA 91109, USA*[1] — A ϕ^4 model has been applied to the liquid-gas critical point with the universal ratios of leading critical and correction amplitudes built in. We have used this model to analyze recently obtained heat capacity at constant volume, C_V and isothermal susceptibility, χ_T data near the critical point of the pure ^{3}He. The C_V, and χ_T measurements were performed in the same sample cell along the critical isochore over the reduced temperature range of $10^{-4} < |T/T_c - 1| < 10^{-1}$. This RG-based crossover ϕ^4 model with a minimal set of *three* adjustable parameters provides an excellent fit to the C_V and χ_T data both above and below the critical point. The correlation length, ξ, calculated from the ϕ^4 model with the three pre-determined parameters, agrees with previous experimental measurements over the entire crossover range. The good agreement between the ϕ^4 model calculation and the experimental measurements extends beyond the theoretically predicted crossover range.

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[X] Prefer Oral Session
[ ] Prefer Poster Session

Date submitted: November 28, 2000

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